African Invertebrates Vol. 48 (2) Pages 47–53 Pietermaritzburg December, 2007

A revision of the endemic South African dark sac spider genus *Austrophaea* (Araneae: Corinnidae)

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ABSTRACT

The genus *Austrophaea* is revised and the two known species, *A. zebra* Lawrence, 1952 and *A. festiva* Lawrence, 1952, are synonymised. The lectotype and a paralectotype are designated for *A. zebra*, and notes are provided on the distribution and habitat preferences of this species.

KEY WORDS: Araneae, Corinnidae, Corinninae, *Austrophaea*, *Brachyphaea*, *Medmassa*, *Pronophaea*, Afrotropical, revision, redescription, lectotype, new synonymy.

INTRODUCTION

The dark sac spider genus *Austrophaea* Lawrence, 1952 is currently represented by two South African species, both previously known only from KwaZulu-Natal. These spiders are one of the easiest corinnid genera to identify because of their uniquely structured forelegs and distinctive markings in both sexes (Figs 1–6).

In his descriptions of the two species, *A. zebra* and *A. festiva*, Lawrence (1952) mentioned that the latter species 'agrees in general colouring and in the size and spination of the anterior legs' with *A. zebra*. The characters he used to separate the species include the presence of four rather than three prolateral leg spines on femur I of *A. zebra*, the projecting style (embolus) of the male palp of *A. festiva*, and the different shape of the retrolateral tibial apophysis (RTA) of the male palp. However, study of the male types revealed that the right palp of *A. zebra* is damaged and the embolus is missing (left palps of both types are missing), which may explain Lawrence's reference to the long, protruding embolus of *A. festiva*. In addition, the RTA of both species has the same structure; manipulating the palp and viewing it at different angles (Figs 7–13) gives the impression of variable shape, as presented in Lawrence's (1952: 218) figures 66 and 68. Study of the material available also indicates considerable variation in the number of leg spines (particularly ventral tibial spines), even within the same specimen, which suggests that this is an unreliable character to separate the species. Consequently, the species are synonymised and *Austrophaea* is reduced to a monotypic genus. Redescriptions of both sexes are provided here, with notes on the distribution and habitat preferences of the species.

Austrophaea is currently placed in the Corinninae based on the numerous pairs of ventral leg spines, bulging anterior eye region and sclerotised abdomen of males (Dippenaar-Schoeman & Jocqué 1997). However, the relationships of the Afrotropical Corinninae are unresolved, and from initial studies of their genital and somatic morphology it appears that *Austrophaea*, *Brachyphaea* Simon, 1895, and *Pronophaea* Simon, 1897 may be most closely related, although the latter two genera were misplaced in the Trachelinae by Dippenaar-Schoeman and Jocqué (1997). These three genera have very different genital structures compared to other corinnine genera (see Bonaldo 2000;

Deeleman-Reinhold 2001) and may represent a monophyletic group. This is the first revisionary paper in a series on the Corinninae of the Afrotropical Region.

MATERIAL AND METHODS

Material used in this study was observed in 70% ethanol using a stereo microscope for descriptions and measurements. Photographs were taken using a Nikon Coolpix 8400 mounted on a Nikon SMZ 800 stereo microscope. The epigynes and male palps of representative specimens were dissected and cleaned in a Branson 3200 ultrasonic bath for 10 minutes in 70% ethanol, after which they were drawn.

All measurements are given in millimetres (mm). A range of body measurements is given for the smallest and largest specimens of each sex, and eye and leg measurements are given for the largest specimen of each sex. Descriptions of leg spination follow the format of Bosselaers and Jocqué (2000).

The following abbreviations are used in the descriptions:

AER – anterior eye row
AL – abdomen length
ALE – anterior lateral eye
AME – anterior median eye
AW – abdomen width
CL – carapace length
CW – carapace width
do – dorsal
FL – fovea length
PER – posterior eye row
pl – prolateral
plv – prolateral ventral
PLE – posterior lateral eye
PME – posterior median eye
rlv – retrolateral ventral
SL – sternum length
SW – sternum width
TL – total length

Despite requests of material from various South African and international museums, very few specimens were available for this study. Unfortunately, this made a fine-structure examination of the spinnerets, genitalia, and other potentially significant structures impossible. It is hoped that by the time the genera *Brachyphaea* and *Pronophaea* are revised, fresh *Austrophaea* material will have been collected for a comparative study.

Material examined is deposited in the Natal Museum, Pietermaritzburg (NMSA) and the National Collection of Arachnida, Pretoria (NCA). Labels of holotype material are quoted *verbatim*. A slash (/) indicates the end of a line of print, and two slashes (//) signify data on a further label.

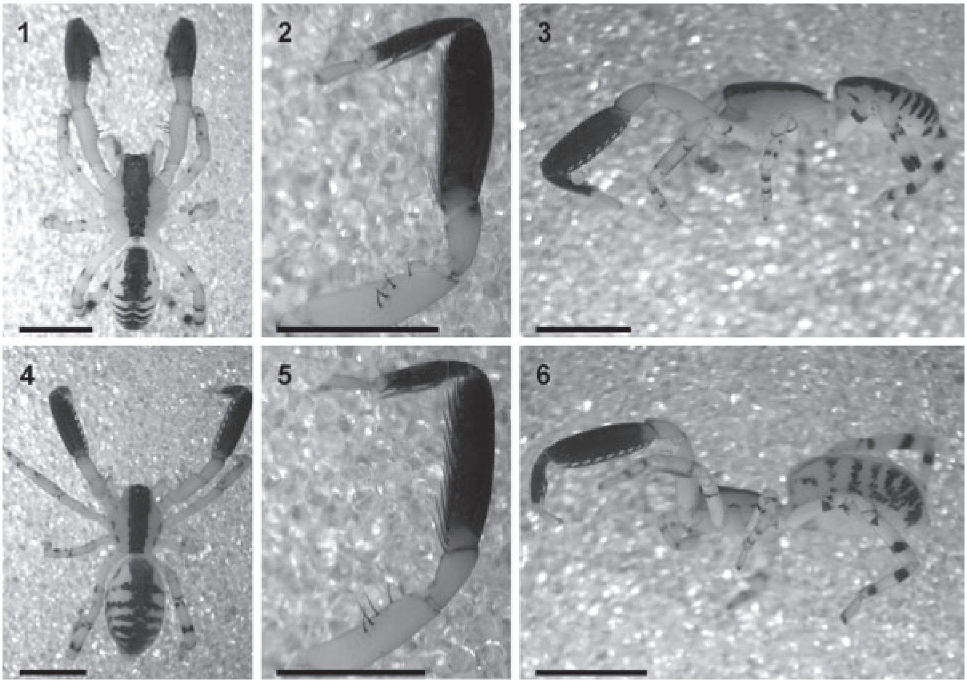
TAXONOMY

Genus *Austrophaea* Lawrence, 1952

Type species: *Austrophaea zebra* Lawrence, 1952.

Diagnosis: *Austrophaea* specimens can be easily recognised by the very robust anterior legs, particularly the tibiae and metatarsi, which are enlarged and broad, and very strongly spined ventrally; the carapace is somewhat flattened with a median black longitudinal stripe, and the abdomen bears a black median stripe and 5–7 posterior transverse bands.

Description: Medium-sized spiders, 4.5–6.5 mm in length; cream to deep yellow-orange in colour, with black markings on carapace and abdomen; AER and PER procurved, AME>ALE; AME closer to ALE than to each other; PME and PLE subequal in size;



Figs 1–6. *Austrophaea zebra* Lawrence: (1–3) male: (1) general habitus, (2) morphology of leg I, (3) lateral view; (4–6) female: (4) general habitus, (5) morphology of leg I, (6) lateral view. Scale bars = 2.5 mm.

PME closer to each other than to PLE; carapace slightly convex, somewhat flattened, slightly narrowed behind eye region and invaginated posteriorly; widest at second coxae; legs I longest, with greatly enlarged tibiae and metatarsi; remaining legs with narrow black rings on femora, patellae, tibiae and metatarsi; femora of legs I strongly spined on prolateral margin, tibiae and metatarsi of legs I and II strongly spined ventrally; leg formula 1423; abdomen oval, tapering posteriorly; male with narrow dorsal scutum, absent in females; ventral sclerites absent.

Austrophaea zebra Lawrence, 1952

Figs 1–15

Austrophaea zebra: Lawrence 1952: 217, figs 63–67.
Austrophaea festiva Lawrence, 1952: 219, fig. 68. **Syn. n.**

Redescription:

Male.

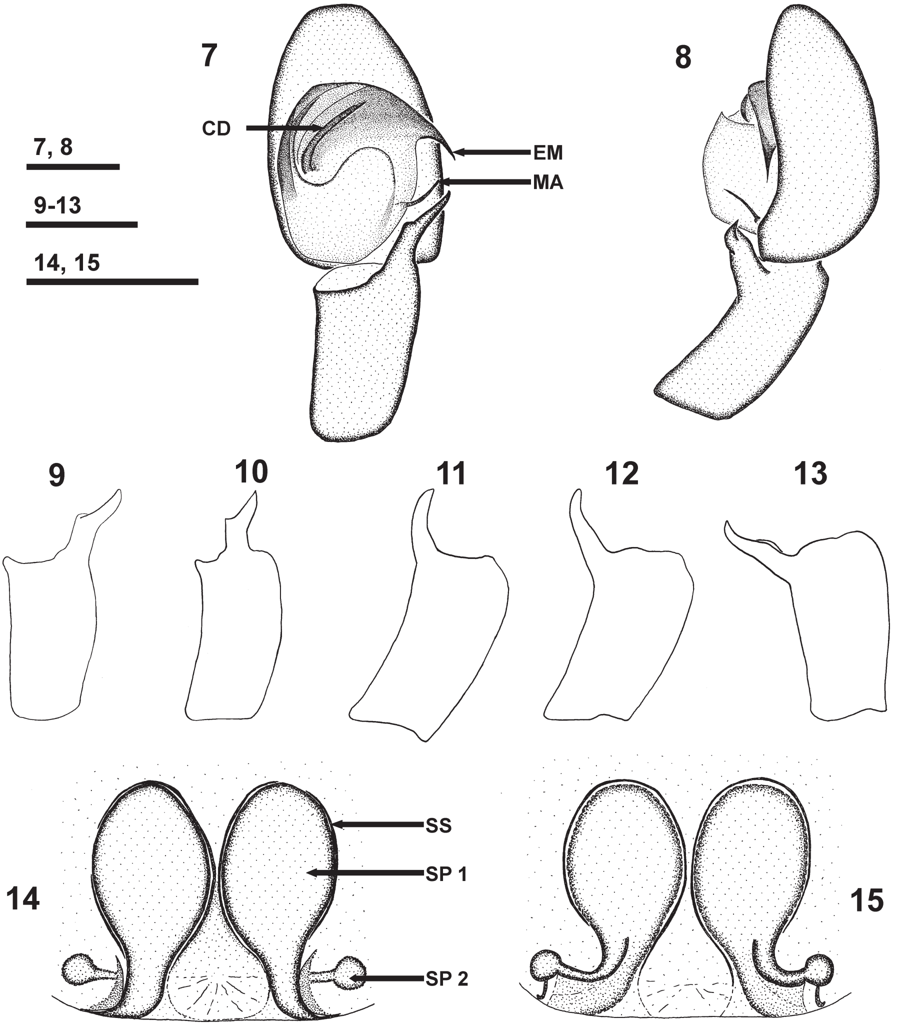
Measurements: CL 2.45–2.78, CW 2.00–2.20, AL 2.25–2.98, AW 1.35–1.80, TL 4.48–5.65, FL 0.20–0.25, SL 1.30–1.38, SW 1.13–1.23. Interdistances between eyes: AME–AME 0.11, AME–ALE 0.10, ALE–ALE 0.54, PME–PME 0.14, PME–PLE 0.19, PLE–PLE 0.74.

Length of leg segments (sequence from femur to tarsus, and total): I 2.35+1.20+2.70+1.88+0.63=8.76; II 1.70+0.85+1.63+1.30+0.60=6.08; III 1.23+0.75+0.95+1.00+0.48= 4.41; IV 2.00+0.93+1.80+1.85+0.65=7.23.

General appearance as in Fig. 1. Carapace slightly convex and somewhat flattened, highest at midpoint (Fig. 3); surface very finely wrinkled with scattered tiny straight black setae; fovea somewhat indistinct, moderately long; carapace pale cream-yellow to deep yellow-orange, with broad median dark brown mottled stripe extending from anterior eye row to posterior margin of carapace (Fig. 1), and dark brown spots laterally at bases of coxae II, III and IV. All eyes with black rings; anterior eye row procurved, medians very slightly larger than laterals; clypeus height slightly smaller than AME diameter; AME separated by their diameter; AME separated from ALE by two-thirds AME diameter; PER procurved, medians subequal to laterals; PME separated by their diameter; PME separated from PLE by approx. 1.5 times PME diameter. Chelicerae yellow to yellow-orange, with black spot proximally on anterior margin; scattered long brown setae on anterior surface; three teeth on promargin, distal tooth smallest, median and proximal teeth subequal in size; median and distal teeth closer to each other than to proximal tooth; retromargin with three teeth, distal tooth smallest and furthest away from other teeth; endites rounded on anterior margin with well developed serrula laterally; retrolateral margin with distinctive heel, truncated towards posterior margin; labium rounded anteriorly, as wide as long. Abdomen oval-elongate, with narrow brown dorsal scutum extending to two-thirds abdomen length; dorsum cream to pale yellow, with dark brown median stripe with 5–7 lateral branches extending to spinnerets (Fig. 1); dorsum covered with scattered tiny straight black setae; ventrum pale cream, unsclerotised, covered with fine short straight setae. Legs I longest, stoutly built, particularly tibiae and metatarsi (Fig. 3); remaining legs considerably less robust and shorter; tarsal claws small, situated laterally within dense claw tufts; coxae yellow; femora I cream to yellow, with indistinct black ring laterally and posteriorly; femora II to IV cream to yellow, with distinct rings laterally and ventrally at two-thirds and at end of each femur; patellae yellow, with narrow black ring at distal end; tibiae I dark brown, greatly enlarged and somewhat flattened ventrally, with pairs of long flattened spines (Fig. 2); tibiae II to IV cream to yellow, with black spots laterally (tibiae II) or black rings (tibiae III to IV) dorsally and laterally at one-third and two-thirds their length; metatarsi I dark brown, yellow distally, enlarged and slightly flattened ventrally, with strong paired spines ventrally; metatarsi II to IV cream to yellow with black rings dorsally and laterally at one-third and two-thirds their length; all tarsi uniform cream or yellow; leg spination: femora: I *pl* 4 *do* 1 *rlv* 1, II *do* 1, III *do* 1, IV *do* 1; patellae: I *plv* 1; tibiae: I *plv* 9 *rlv* 9, II *plv* 8 *rlv* 6–7; metatarsi: I *plv* 2 *rlv* 2, II *plv* 2 *rlv* 2. Male palp cream or yellow, without spines; palpal tibiae with distinctive subtriangular retrolateral apophysis with swelling on distal surface (Figs 7–13); cymbium densely setose, particularly in distal half; tegulum rounded, with thick embolus distally, originating prolaterally, curving retrolaterally, projecting beyond retrolateral margin of cymbium (Fig. 7); distal end of coiled sperm duct distinctly visible; median apophysis small, spine-like, situated retrolaterally and medially on tegulum (Figs 7, 8).

Female.

Measurements: CL 2.50–3.00, CW 1.89–2.30, AL 3.48–3.55, AW 2.00–2.45, TL 6.10–6.45, FL 0.20–0.29, SL 1.25–1.50, SW 1.08–1.30. Interdistances between eyes: AME–AME 0.14, AME–ALE 0.10, ALE–ALE 0.58, PME–PME 0.15, PME–PLE 0.19, PLE–PLE 0.82.



Figs 7–15. *Austrophaea zebra*: (7–13) male (Kei Mouth): (7, 8) palp, ventral and retrolateral views; (9–13) schematic representation of male palpal retrolateral tibial apophysis in ventral (9), retrolateral ventral (10), retrolateral (11), retrolateral dorsal (12), and dorsal views (13); (14, 15) female (Port Edward): (14) epigyne, ventral view, (15) vulva, dorsal view. Abbreviations: CD – coiled sperm duct; EM – embolus; MA – median apophysis; SS – spermathecal socket; SP 1 – spermatheca 1; SP 2 – spermatheca 2. Scale bars = 0.25 mm.

Length of leg segments (sequence from femur to tarsus, and total): I 2.45+1.28+3.00+0.95+0.60=8.28; II 1.80+0.90+1.83+1.38+0.50=6.41; III 1.43+0.80+1.03+1.13+0.53= 4.92; IV 2.20+0.93+2.00+2.00+0.65=7.78.

General appearance and colouration as for male (Figs 4–6). Chelicerae with three teeth on promargin, median tooth largest and proximal tooth smallest; median and distal teeth situated close together; retromargin with three teeth situated close together; median tooth largest, proximal and distal teeth smaller, subequal in size. Abdomen shorter and broader than that of male, without dorsal scutum. Legs similar to male in structure

(Fig. 5); leg spination: femora: I *pl* 4 *do* 1 *rlv* 5 or 6 erect setae in row, II *do* 1, III *do* 1, IV *do* 1; patellae: I *plv* 1 *rlv* 1 or 2 smaller spines; tibiae: I *plv* 9–12 *rlv* 9–11, II *plv* 9 *rlv* 9; metatarsi: I *plv* 2–3 *rlv* 2–3, II *plv* 2 *rlv* 2. Spermathecae 1 oval, tear-shaped and narrowed posteriorly, situated within sclerotised sockets (Fig. 14); copulatory openings situated posterolaterally, entering spermathecae directly (Fig. 15); spermathecae 2 small, globose, situated postero-laterally (Figs 14, 15).

The types are placed together in a bottle with the following label: 'NM[SA] 5281 / SYNTYPES / Austrophaea zebra Lawrence, 1952 / RSA, KZN, Tongaat. October 1948. / Carnegie.'

Lectotype (here designated): ♂ deposited in NMSA (examined). Two labels accompany the specimen: 'Natal Museum / Austrophaea zebra Lawr. / Tongaat. / Coll. Carnegie. / Oct. 1948 N. M. 5281 // Type ♂ 5281 / Tongaat'.

Paralectotype (here designated): ♀ deposited in NMSA (examined). Two labels accompany the specimen: 'Natal Museum / Austrophaea zebra Lawr. / Tongaat. / Coll. Carnegie. / Oct. 1948 N. M. 5281 // 5281 – Tongaat / Carnegie IX 1948'.

Type material of synonym: Holotype: ♂ deposited in NMSA (examined). One accompanying label: 'NM 1802 / HOLOTYPE / Austrophaea festiva Lawr., 1952 / RSA, KZN, Pietermaritzburg. 1917. / C. Akerman'.

Other material examined: SOUTH AFRICA: *KwaZulu-Natal*: 1♀ Ashburton, ii.1985, E. Venter (NMSA 17054); 1♀ Pietermaritzburg, iv.1965, R. Bigalke (NMSA 9481); 1♀ Pietermaritzburg, xii.1940, E. Pratt-Yule (NMSA 3345); 1♂ Pietermaritzburg, Lynnfield Park, iii.1989, A.E. Whittington (NMSA 6865); 1♀ Port Edward, 31º03'S:30º13'E, x.1986, J. Stannard (under stone) (NMSA 17056); 1♀ Port Edward, Blencanthra Farm, 5 km NE of Port Edward, 31º02'S:30º10'E, 335 m a.s.l., 6.iv.1983, J. Stannard (outside on paving bricks) (NMSA, no deposit number); 1♂ Scottburgh, ii.1943, W.G. Rump (NMSA 3883); *Eastern Cape*: 8 immatures, 3♂ Kei Mouth, 32º41.206'S:28º22.497'E, 08.xii.2005, C. Haddad (leaf litter, coastal forest) (NCA 2006/1279); 1♀ Port Shepstone, vii.1961, A. Manning (NMSA 8092).

Distribution: *Austrophaea* is an endemic South African genus, known only from KwaZulu-Natal and Eastern Cape (Fig. 16).

Habitat preferences: *Austrophaea* is known only from low-lying grasslands, savannah, and coastal forests in the eastern parts of South Africa, and is probably an exclusively ground-dwelling spider as no specimens have been collected from foliage. The specimens collected by the author at Kei Mouth were found in leaf litter between grasses in the ecotone between coastal forests and adjacent grassland.

DISCUSSION

Austrophaea is a morphologically distinctive genus that is easy to separate from other Corinnidae. The peculiar structure of the tibia and metatarsus of leg I of both sexes is a character that immediately separates it from *Pronophaea* (including some species currently misplaced in *Medmassa* Simon, 1887—see Deeleman-Reinhold 2001: 346 for comments and generic diagnosis) and *Brachyphaea*.

These three genera appear to be related based on the genital morphology (see also Bosselaers & Jocqué 2002): males have a broadly oval cymbium that is densely setose distally on the dorsal surface, a rounded tegulum, and a curving embolus originating prolaterally and curving retrolaterally. This palpal structure is reminiscent of some genera of Thomisidae and Salticidae. The female epigyne consists of simple oval or tear-shaped spermathecae 1 that are covered by a very thin and finely setose layer of integument, with the copulatory openings at the posterior end. No South American or South-East Asian genera share similar genitalic morphology (see Bonaldo 2000; Deeleman-Reinhold 2001).

Somatic morphology of three genera shares similar leg spination (especially ventral leg spines on the anterior legs and prolateral femoral spines on leg I), procurved eye

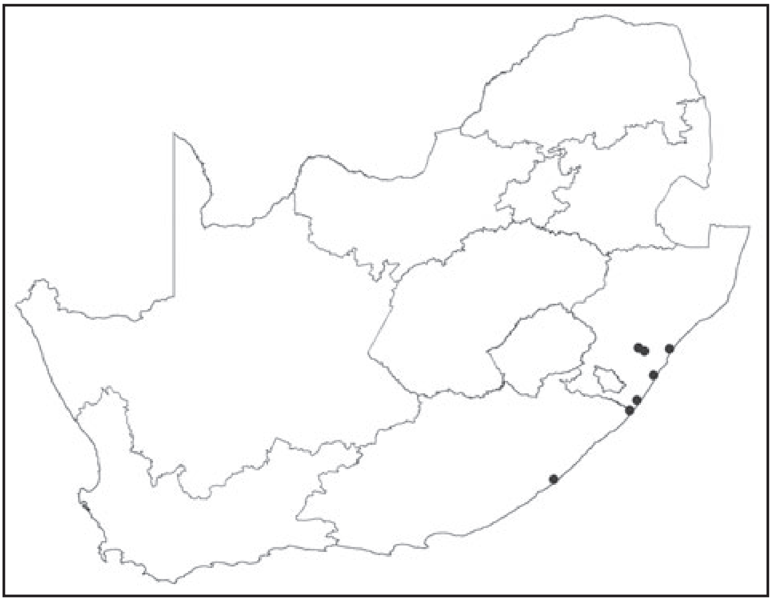


Fig. 16. Distribution of *Austrophaea zebra* Lawrence.

rows, cheliceral dentition (fewer teeth than other Corinninae), and structure of the abdominal scutum in males, and absence of a scutum in females. Future study of the spinneret morphology of the three genera may also yield critical information on their relationships. Unfortunately, the classification of the Corinninae at tribal level is unresolved, but it is likely that these three genera form a monophyletic group at this level.

ACKNOWLEDGMENTS

Ansie Dippenaar-Schoeman (National Collection of Arachnida, Pretoria) and Juthika Baijoo (Natal Museum, Pietermaritzburg) are thanked for the loan of material. Martin Ramírez (Museo Argentino de Ciencias Naturales, Buenos Aires) commented on an earlier version of the manuscript. Jan Bosselaers and Norman Platnick provided useful comments and discussion to improve the final manuscript.

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